

## Specification

1. Title of the Device

Brush holder

2. Claim for Utility Model Registration

A brush holder characterized in that the brush holder comprises:

a brush arm provided with a brush insertion hole; and

a fixing plate made up of an elastic member having a brush insertion portion at a center portion thereof and having clampers for clamping a brush, at opposed edges of the brush insertion portion,

wherein the brush arm and lateral sides of the inserted brush are adapted to be secured by the fixing plate.

3. Detailed Description of the Device

(Field of Industrial Use)

The present Device relates to a brush holder, and in particular, to a brush holder for securing a brush used for a small motor, for example, to a brush arm which is made up of substantially a rigid body.

(Conventional Art)

Brush holders used for small motors, for example, have been machined and formed to provide a raised cut at an end portion of a brush arm structured by a spring member, so that a carbon brush can be inserted thereinto. A carbon brush has been press fitted to the raised cut, or has been adhesively secured to the raised cut using a conductive adhesive.

(Problems to be Solved by the Device)

The conventional way of securing a carbon brush to a brush arm using a conductive adhesive has provided reliability in a sense of securing the carbon brush but has suffered from disadvantages of inefficiency and unsuitableness for mass production.

In addition, a brush holder using a spring member as a brush arm is adapted to press a commutator by making use of the elasticity of the brush arm *per se*, and thus has suffered from a limitation that, for example, a spring member has to be unavoidably used. This type of brush holder has also suffered from the fact that the conductivity cannot be raised. In order to obtain a motor with high power, it has been considered recently to structure brush arms with substantially rigid bodies. This however has brought about a difficulty in holding a carbon brush using the elasticity of a brush arm.

The present Device has been made to solve the problems mentioned above, and has as its object to provide a brush holder which does not use a so to speak spring member for a brush arm *per se*, but uses a member having substantially a rigid body with excellent electrical conductivity, and which enables efficient assemblage of the brush arm and carbon brush.

It should be appreciated that the issue of pressing a brush against a commutator has been solved by a separately worked out pressurizing device.

(Means for Solving the Problems)

In order to solve the problems, a brush holder of the present Device is characterized in that the brush holder comprises: a brush arm provided with a brush insertion hole; and a fixing plate made up of an elastic member having a brush insertion portion at a center portion thereof and having clampers for clamping a brush, at opposed edges of the brush insertion portion, wherein the brush arm and lateral sides of the inserted brush are adapted to be secured by the fixing plate. Referring to the drawings, a description will be given below.

(Embodiments)

Figure 1 is an exploded perspective view of a brush holder related to the present Device; Figure 2 is a view on arrow taken along a line A-A of the brush arm shown in Figure 1; Figure 3 is a vertical cross-sectional view after assembling a brush; Figure 4 is an exploded perspective view of another embodiment of the brush holder related to the present Device; Figure 5 is a vertical cross-sectional view after assembling the brush of Figure 4; and Figures 6 to 8 show another embodiment, the individual figures corresponding to Figures 1 to 3, respectively.

Figures 1 to 3 show an embodiment. The figures illustrate only an end portion of a brush arm 1, which portion is for securing a carbon brush 13. The brush arm 1 is punched with a brush insertion hole 2 for inserting the carbon brush 13 thereinto. Bent portions 3 and 4 are provided at lateral ends of the insertion hole to reinforce the brush arm 1. The brush arm 1 may only be required to have substantially a rigid body with a structure or a thickness which can withstand a pressure that will be applied to the bent portions 3 and 4, as will be described later. A plurality of projections 5 and 6 are provided around the brush insertion hole 2 punched in the brush arm 1 to establish good electrical connection.

Cut and raised brush-pressing portions 9 and 10 are formed at a center portion of a fixing plate 7 structured by a spring member. A brush insertion portion 8 is also provided at the center portion, for the insertion of the carbon brush 13. Bent portions 11 and 12 are formed at lateral ends of the fixing plate 7. The fixing plate 7 is fittingly inserted into the inside of the brush arm 1, so that, as shown in Figure 3, the bent portions 11 and 12 of the fixing plate 7 structured by the spring member can press, from inside, the bent portions 3 and 4, respectively, of the brush arm 1. The brush-pressing portions 9 and 10 of the fixing plate 7 press and clamp respective stepped side faces of the carbon brush 13 that has been press fitted to the fixing plate 7 to thereby secure the carbon brush 13 to the brush arm 1 via the fixing plate 7.

The way of assemblage is explained below. The brush arm 1 is fixedly placed, while the carbon brush 13 is moved upward to have a stepped head portion thereof inserted into

the brush insertion hole 2 of the brush arm 1. Then, the fixing plate 7 is moved downward for press fitting to the stepped head portion of the carbon brush 13. The fixing plate 7 is further moved downward, so that the fixing plate 7 is fitted and inserted into the inside of the brush arm 1. Thus, as described above, the bent portions 11 and 12 of the spring member structuring the fixing plate 7 can press and secure, from inside, the bent portions 3 and 4, respectively, of the brush arm 1. In this case, the insides of the brush-pressing portions 9 and 10 of the fixing plate 7 clamp and secure the respective side faces of the stepped head portion of the carbon brush 13, as described above. The projections 5 and 6 provided at the brush arm 1 then dig into the carbon brush 13 to ensure the fixation and electric conductivity.

In the assemblage explained above, the brush arm 1 has been fixedly placed. The assemblage may alternatively performed by fixedly placing the carbon brush 13 and moving the brush arm 1 and the fixing plate 7 downward, or by fixedly placing the fixing plate 7 and moving the brush arm 1 and the carbon brush 13 upward. Either of the alternations may be usable and may be automatically performed.

Figures 4 and 5 show another embodiment of the brush holder related to the present Device. In the figures, the brush arm 1 is structured by substantially a rigid body, similar to the case described above. Specifically, the brush arm is punched with the brush insertion hole 2 and provided with the bent portion 3 and 4 at respective lateral ends. Hook receivers 14 and 15 for positioning are provided at the bent portions 3 and 4, respectively.

A fixing plate 16 made up of a spring member is provided, at a center portion thereof, with cut and raised brush-pressing portions 17 and 18, and is also provided with a brush insertion portion 19 for having the carbon brush 13 inserted therein. One end of the insertion portion 19 is open to impart the fixing plate 16 with a U-shaped form. Bent portions 20 and 21 are formed at lateral ends of the fixing plate 16. Hooks 22 and 23 are provided at the bent portions 20 and 21, for engagement with the hook receivers 14 and 15 provided at the bent portions 3 and 4 of the brush arm 1, respectively, and for positioning of

the fixing plate 16 inserted into the brush arm 1. The fixing plate 16 is fitted and inserted into the brush arm 1 from the direction of an arrow indicated in Figure 4. Then, as shown in Figure 5, the bent portions 20 and 21 of the fixing plate 16 structured by the spring member are slid along and, at the same time, pressed against the insides of the bent portions 3 and 4, respectively, of the brush arm 1. Also, the brush-pressing portions 17 and 18 of the fixing plate 16 press and clamp respective tapered and stepped side faces of the carbon brush 13 inserted into the brush insertion portion 19. Thus, the carbon brush 13 is secured to the brush arm 1 via the fixing plate 16.

The way of assemblage is explained below. The brush arm 1 is fixedly placed while the carbon brush 13 is moved upward to have the stepped head portion of the carbon brush 13 inserted into the brush insertion hole 2 of the brush arm 1. Then, the fixing plate 16 is moved in the direction indicated by the arrow in Figure 4 to have the fixing plate 16 press fitted to the carbon brush along the tapered and stepped side faces of the carbon brush 13. In this case, the end portions of the clampers 17 and 18 on the side of the open end may be slightly bent toward the bent portions 20 and 21, respectively, to facilitate starting of the press fitting to the carbon brush 13. The end portions of the bent portions 20 and 21 on the side of the open end may also be slightly bent inward to facilitate the fitting and insertion of the fixing plate 16 into the brush arm 1. When the fixing plate 16 is further moved in the direction of the arrow indicated in Figure 4, the fixing plate 16 is permitted to slide, allowing, at the same time, the brush-pressing portions 17 and 18 of the fixing plate 16 to press the tapered and stepped side faces of the carbon brush 13. Thus, the bent portions 20 and 21 of the fixing plate 16 are permitted to slide, pressing the insides of the bent portions 3 and 4 of the brush arm 1, so that the hooks 22 and 23 provided at the bent portions 20 and 21, respectively, of the fixing plate 16 engage with the hook receivers 14 and 15 provided at the bent portions 3 and 4, respectively, of the brush arm 1. In this way, the fixing plate 16 and the brush arm 1 are secured to each other, whereby the carbon brush 13 and the brush arm 1 are secured to each other via the fixing plate 16.

In this case as well, the assemblage may be performed by fixedly placing the carbon brush 13 or by fixedly placing the fixing plate 16.

An embodiment shown in Figures 6 to 8 has components which are removed with the portions corresponding to those indicated by references 3, 4, 11 and 12 in Figures 1 to 3. In this case, the carbon brush is held by the brush-pressing portions 9 and 10. The embodiment shown in Figures 4 and 5 may also be modified in the same fashion as in Figures 6 to 8.

#### (Advantages of the Device)

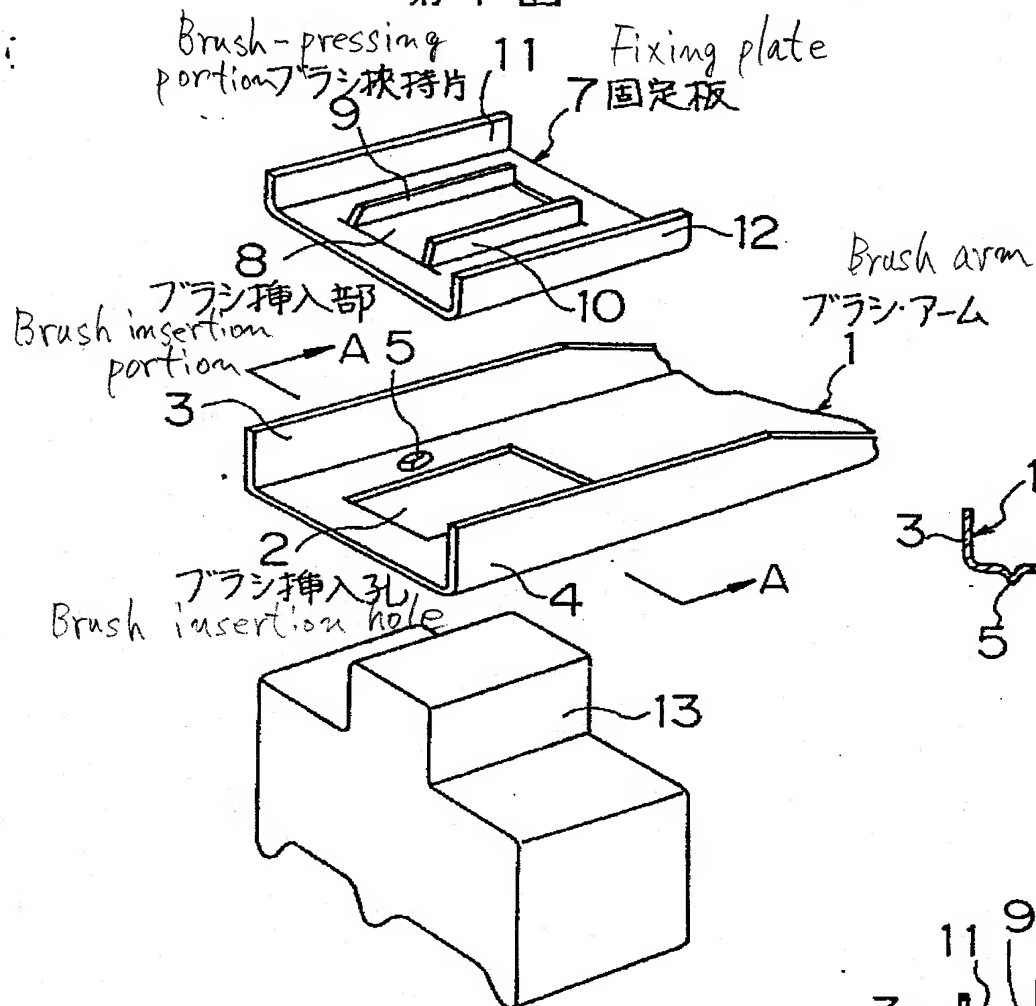
As described above, the present Device can readily realize assemblage using an automatic machine and thus can realize mass production. In addition, the projections provided at the brush arm can establish good electrical connection with the carbon brush to thereby ensure electrical characteristics equivalent to those attained by adhesive fixation.

#### 4. Brief Description of the Drawings

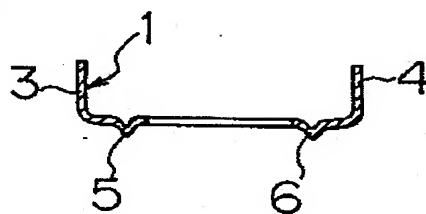
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In the figures, indicated by 1 is a brush arm, by 2 is an insertion hole, by 3 and 4 are bent portions, by 5 and 6 are projections, by 7 is a fixing plate, by 8 is a brush insertion portion, by 9 and 10 are brush-pressing portions, by 11 and 12 are bent portions, by 13 is a carbon brush, by 16 is a fixing plate, by 17 and 18 are brush-pressing portions, by 19 is a brush insertion portion, and by 20 and 21 are bent portions.

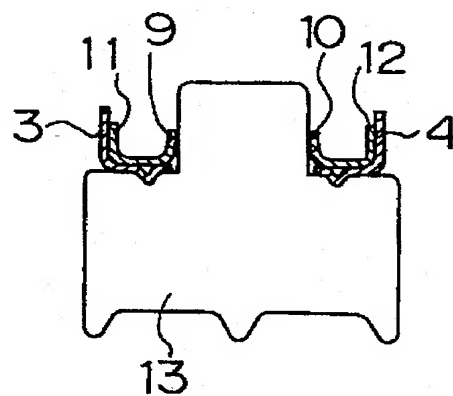
第1図



第2図



第3図

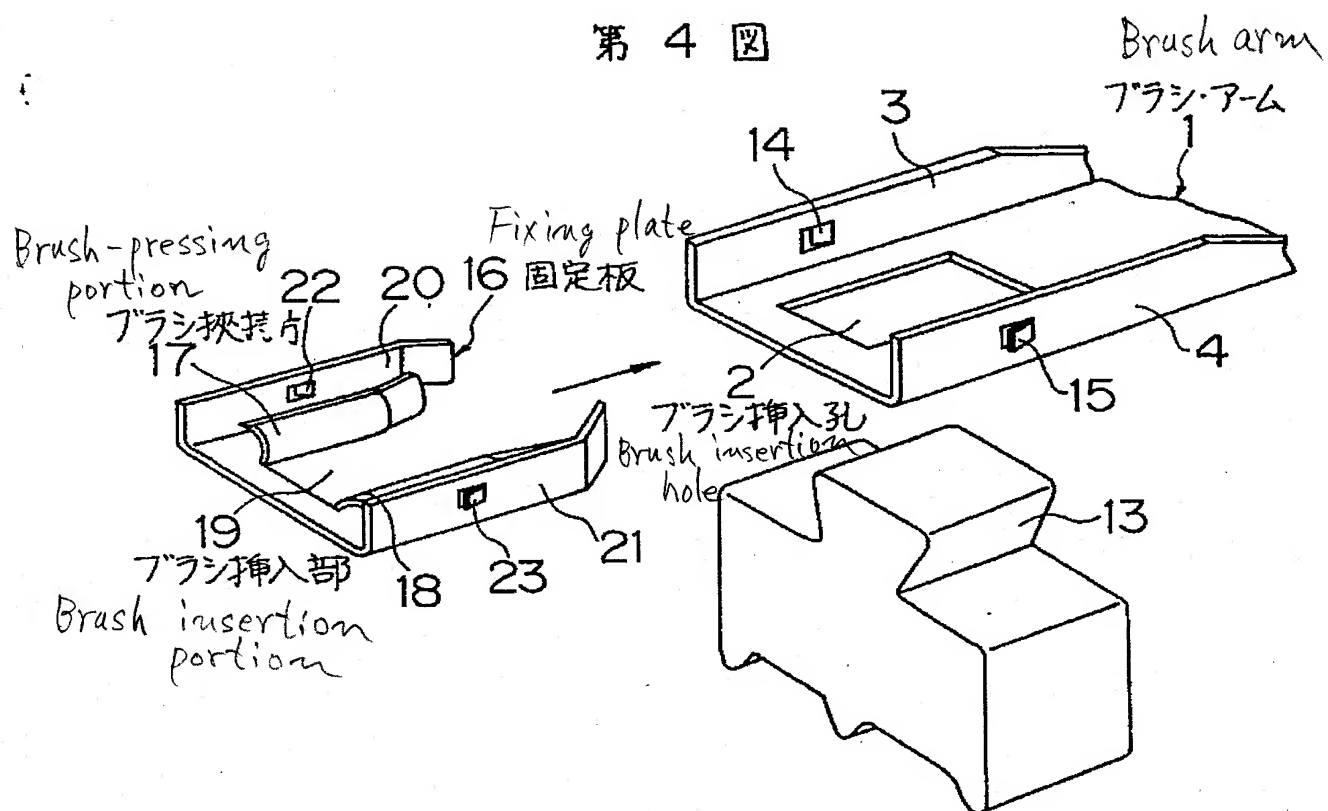


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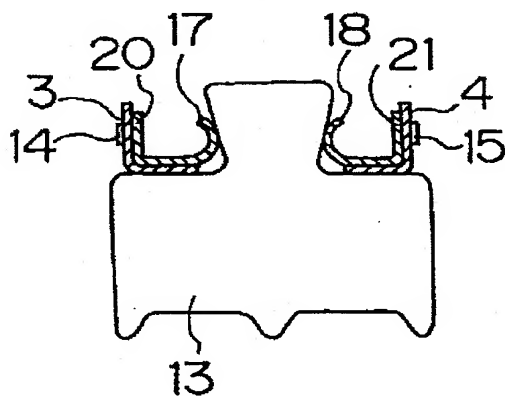
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第 4 回



第 5 回



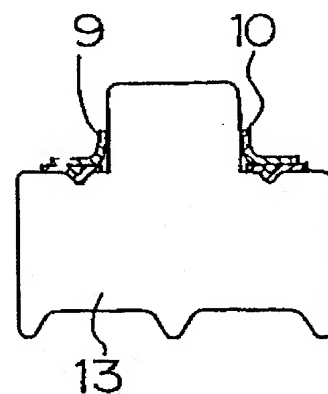
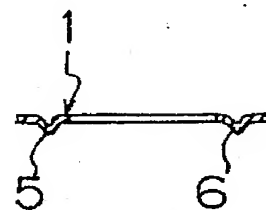
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